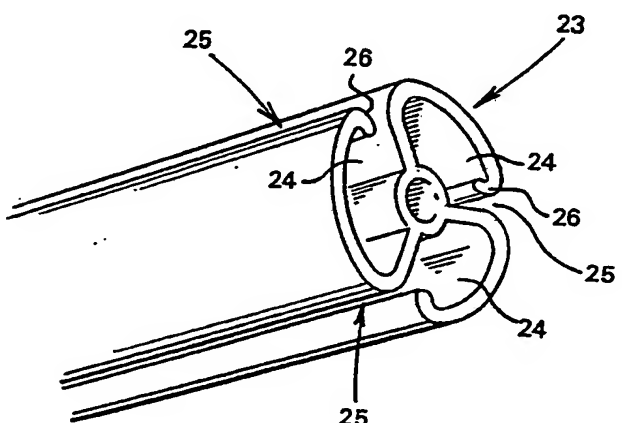


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<p>(21) International Application Number: PCT/AU92/00467 (22) International Filing Date: 3 September 1992 (03.09.92) (30) Priority data: 91/6975 3 September 1991 (03.09.91) ZA (71)(72) Applicant and Inventor: HOLSHAUSEN, Nicholas, Hugo [AU/ZA]; 14 Collins Street, Kensington B, Randburg, Transvaal (ZA). (74) Agents: HARWOOD, Errol, John et al.; Wray & Associates, Primary Industry House, 239 Adelaide Terrace, Perth, W.A. 6000 (AU).</p>		<p>(81) Designated States: AT, AU, BB, BG, BR, CA, CH, CS, DE, DK, ES, FI, GB, HU, JP, KP, KR, LK, LU, MG, MN, MW, NL, NO, PL, RO, RU, SD, SE, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, SN, TD, TG). Published With international search report.</p>
<p>(54) Title: ELECTRICAL CABLE CONTAINMENT</p> <div data-bbox="487 1218 1104 1638"></div> <p>(57) Abstract</p> <p>An electrical cable containment device comprises an elongate flexible member (23) having one or more containment passages (24) extending the length thereof. The passages each have an entrance opening (25) thereto which allows access to the passage along its length. The device may be comprised of a multiplicity of interconnected members (51) which are connected together through an articulated connection (56) which allows the necessary flexibility. An electrical cable containment box (5) is adapted to fit behind a desk-top item of electrical equipment (1) such as a personal computer. The electrical cables which are connected to the equipment are contained and shielded from view by the box. An outlet opening (22) from the box is adapted to have an electrical cable containment device fitted thereto.</p>		

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"ELECTRICAL CABLE CONTAINMENT"

BACKGROUND TO THE INVENTION

THIS invention relates to electrical cable containment. The invention will be particularly described with reference to the containment of electrical cables which attach to the rear of desk top computers and other office type equipment, but it is to be understood that aspects of the invention may have other applications.

Many desk tops support a wide range of electrical equipment. A modern office desk may have, for example, a personal computer, a telephone, and a calculator supported thereon. The computer will have a series of electrical wires or cables connecting thereto including wires which connect the computer to a printer, a central processing unit, or a modem. The wires from these items of equipment tend to be unsightly when viewed from the back of the desk. This problem is not too serious when the desk back is placed against a wall or panel but, especially in open plan offices, such an arrangement of the desk is not always feasible. Where the back of the desk faces into a room or onto a passage the wires present an unattractive sight.

SUMMARY OF THE INVENTION

According to a first aspect of the invention there is provided an electrical cable containment device comprising an elongate flexible member having at least one cable containment passage therein extending the length of the device and an entrance opening into said passage which runs the length of the passage for

inserting electrical cable laterally into the passage. Preferably there are at least two containment passages each having its own entrance opening. There is preferably a return lip or other formation which runs the length of the or each passage adjacent the respective opening which in use prevents cables which are within the passage inadvertently coming out of the passage.

The containment device may be made from a resilient flexible material, such as a plastics material, said material being sufficiently flexible to allow the insertion of cables into the passage and the removal of cables from the passage.

The containment device may be formed from a multiplicity of interconnected elements which, when connected together, form the elongate flexible member. The elements may have a central passage through which a rope or the like is passed to interconnect the elements together. Alternatively, the elements may each carry connection formations thereon which enable the elements to be connected together end-to-end in a chain-like manner. Each of the elements may have an axially aligned male member mounted on one end thereof and an axially aligned female member formed in the opposite end thereof, the male and female members being shaped and configured such that the male member of one element may be connectable to the female member of an adjacent member to hold adjacent members together, the two elements being movable relative to each other in an articulated manner. Optionally the male member is connected to the element on which it is mounted through an articulated connection. The articulated connection may be a ball and socket type connection.

According to a second aspect of the invention there is provided an electrical cable containment box which includes a housing having a back, sides, and a top, and which is adapted to connect to the back of an item of electrical equipment, there being at least one outlet opening from said box through which a plurality of electrical cables can pass. The box may have one or more feet adapted to extend underneath the item of electrical equipment so that, in use, the electrical equipment

- 3 -

rests on, and thereby holds the box to the rear side of the electrical equipment. The box may be adjustable in width and/or height, and may have a series of openings therein which act as air vents.

The box, preferably has a connection facility incorporated therein for connecting a containment device of the type described herein to the box. That connection facility may comprise a removable plate with said outlet opening formed therein and an access slot connecting said outlet opening to the edge of the plate for admitting electrical cables into the opening.

Embodiments of the invention are described in detail in the following passages of the specification which refer to the accompanying drawings. The drawings, however, are merely illustrative of how the invention might be put into effect, so that the specific form and arrangement of the various features shown is not to be understood as limiting on the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

- Figure 1 shows a perspective view of a containment device and containment box according to the invention fitted to the rear side of an item of electrical equipment;
- Figure 2 shows a cross sectional view along line II-II of Figure 1;
- Figure 3 shows a side view of a containment box according to the invention;
- Figure 4 shows a perspective view of one embodiment of containment device according to the invention;

SUBSTITUTE SHEET

- 4 -

- Figure 5 shows an end view of the containment device depicted in Figure 4;
- Figure 6 shows an end view of an alternative embodiment of containment device;
- Figure 7 shows an end view of yet a further embodiment of containment device;
- Figure 8 shows a side view of a series of interconnected containment elements;
- Figure 9 shows a cross sectional side view of an alternative embodiment of interconnected containment elements; and
- Figure 10 shows a front perspective view of an element of a further embodiment of containment device;
- Figure 11 shows a rear perspective view of the device shown in Figure 10;
- Figure 12 shows a rear end view of the device shown in Figure 10;
- Figure 13 shows a side view of three elements of the type shown in Figure 10 connected together; and
- Figure 14 shows a perspective view of an alternative embodiment of containment box suitable for having a containment device of the type shown in Figures 10 to 13 connected thereto.

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DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring initially to Figures 1, 2 and 3 an item of computer equipment indicated at numeral 1 rests on the upper surface of a desk 2. The rear side 3 of the computer equipment faces towards the back 4 of the desk. The computer equipment 1 may, for example, comprise desk top personal computer. As is well known, a series of electrical cables (not shown) will connect into the back 3 of the computer equipment 1 and this invention is particularly concerned with the containment of those cables.

A containment box 5 is fitted to the back face 3 of the electrical equipment 1. The box 5 includes a back panel 6 a top panel 7, side panels 8, and a floor panel 9. The front side 10 of the box (which is against the computer equipment 1) is open so that any wires or the like which extend from the back 3 of the electrical equipment will pass into the box 5 without interference.

The box 5 may be adjustable in width and/or height. The box depicted in Figures 1 and 2 of the drawings is adjustable in width. As shown clearly in Figure 2 the box 5 is formed in two sections numbered 11 and 12 which overlap each other as indicated at 13 and are held together by a pin 14. The arrangement is such that the two sections 11 and 12 may slide towards or apart from each other and the one section 12 is provided with a slot 15 which limits the extent to which the two sections may be moved together or apart. This adjustment facility is provided so that the width of the box can be varied according to the item of electrical equipment to which it is to be fitted.

The box 5 is preferably provided with a series of openings in the side and/or floor thereof through which electrical cables can pass. As shown in the drawings, at least one side 8 of the box is provided with an opening as indicated at numeral 16. Electrical wires, for example, a telephone or desk top calculator can pass into the opening 16. Thus, the telephone or calculator will sit on the desk alongside the

electrical equipment 1 and the wires from the telephone and/or calculator will pass into the box 5 through the side opening 16. In other instances the desk 2 may be provided with electrical wire openings in the upper surface thereof. These wires may, for example, be power cables or the like. The wires which pass up through the surface of the desk 2 may pass into the box 5 through openings 17 in the floor 9 of the box 5.

In many instances the computer equipment 1 to which the box 5 attaches will have a cooling fan connected thereto and therefore the box 5 may be provided with vents as indicated at numeral 18 to allow for the free passage of cooling air through the box to the item of computer equipment. Clearly it is not essential that the box 5 be made to be dimensionally adjustable. Indeed, in certain instances it may be preferable for the box to be custom made for a particular computer or like equipment and in this instance it will be coloured and contoured to conform exactly to the periphery of the respective item.

The box is preferably provided with means for connecting the box to the item of computer equipment. This may conveniently comprise an extension of the floor panel 9 as indicated at numeral 20. The extension 20 is preferably substantially planar and is adapted to fit underneath the computer equipment 1 so that the computer equipment 1 rests on the extension 20. The extension 20 is preferably sufficiently thin so as not to unduly lift the computer equipment relative to the desk surface. With the computer equipment 1 resting on the extension 20 the box 5 will be firmly held against the back 3 of the computer equipment. Clearly other forms of connection arrangements are possible such as clip connection and the like which connect the box 5 to the back face 3 of the computer equipment.

Once all wires from the desk top including wires from computer equipment have passed into the box 5 they will be gathered together and pass out of the box 5 through an outlet 22 in the back face 6 of the box 5. It will be appreciated that the box 5 will shield the manner in which the electrical wires connect to the computer

- 7 -

equipment 1 and thus the box 5 will serve to neaten the appearance of the back face 3 of the computer equipment and the arrangement of wires in that region.

It is preferred that an electrical cable containment device 23 connects to the opening 22. One example form of electrical cable containment device 23 is depicted in Figure 4 of the drawings. The containment device as shown in Figure 4 includes three passages 24 which run the length of the cable containment device 23. The passages 24 each have an entrance opening 25 which runs the length of the containment device 23 and provides an opening along the entire length of the passage 24.

The containment device 23 is preferably resiliently flexible to enable the containment device 23 to bend around corners to reach appropriate connection points such as electrical wall sockets. It is envisaged that the containment device 23 may be formed from a relatively flexible plastics material to enable it to adopt the required form. As indicated in Figure 4 of the drawings the containment device 23 is formed of a single section of hose like material within which the passages 24 are formed. However, as will be described in more detail herebelow, the containment device 23 may be formed of a multiplicity of interconnected elements each of which includes a passage 24, the elements when aligned forming a substantially continuous series of passages 24 which extend the length of the device.

It is important that once cables have been inserted into the passages 24 through openings 25 they are retained within the passages 24. To achieve this it is preferred that some sort of return lip is provided within the passage 24 at the region of the entrance 25. Lips 26 are shown which run the length of the openings 25 and serve to retain cables in each of the passages 24.

It is preferred that the device 23 is formed of a resiliently flexible material such as a plastics material so that the openings 25 can be widened to insert cables into the passages 24, or remove cables from the passages 24. It will be appreciated that

SUBSTITUTE SHEET

- 8 -

some cables are of larger diameter than other cables and thus it is important that the entrances 25 are able to open sufficiently widely to accommodate a range of cable thicknesses. The return lips 26 will serve to capture and hold whatever cables are located in the different passages 24.

It is preferred that there are at least two passages so that different forms of cables may be located in separate passages. For example, power cables may be all located in one of the passages 24 and information conveying cables such as those from telephones and or computers may be conveyed in other passages.

Figures 6 and 7 depict different forms of containment devices. Figure 6 shows a containment device 30 having two passages 31 which extend the length of the device. A central opening 32 is provided to receive a rope as will be described in more detail with reference to Figure 8. The two passages 31 each have an opening 33 and a return lip 34 similar to the arrangement shown with respect to Figures 4 and 5. Figure 7 shows a yet further alternative in which a containment device 35 is provided with a pair of passages 36 each having an opening 37. A central passage 38 is also provided. The device 35 has an additional passage indicated at 39 which may be used to mount the device 35 to a support surface. The passage 39 has an opening 40 and it is envisaged that a rail or key (not shown) could be mounted to a fixed surface and used to mount the device 35 to that fixed surface with the rail or key located in the passage 39.

As previously mentioned, it is important that the containment device 23 is flexible. To achieve the desired degree of flexibility it may be preferable to form the device 23 from a series of interconnected elements as indicated in Figures 8 and 9. Referring specifically to Figure 8, it will be noted that the series of elements indicated at numeral 41 are threaded onto a rope 42, the rope 42 running down the central passage which extends down the centre of each of the elements. A gap indicated at numeral 43 is provided between adjacent elements and this gap 43 allows the assembled device to flex as required.

SUBSTITUTE SHEET

- 9 -

A somewhat similar arrangement is shown in Figure 9 but in this arrangement the elements 44 each have a connection formation 45 formed on one end thereof, the connection formations being adapted to fit into a socket 46 on the other end of an adjacent element, the sockets 46 having an entrance lip 47 which ensures that the connection formation 45 engages and is releasably held within the socket 46. A gap 48 is defined between adjacent elements 44 and this gap permits the assembled device to flex in the manner previously described.

Turning now to Figures 10 to 13 of the drawings a yet further embodiment of containment device is shown. The containment device indicated by numeral 50 in Figure 13 is comprised of a multiplicity of separable elements 51, each of which is formed of a generally tubular body 52 slit longitudinally, as indicated by slit 53. A mounting bracket 54 is formed within the interior of the tubular body and that bracket 54 divides the interior of the tubular body into two passages 55. The body 52 is formed of a resilient material such as moulded plastics, which is resiliently distortable. To obtain access to the passages the slit 53 is widened by distorting the body outwardly. The slit is located midway between the two passages 55 so that a cable being inserted into the passages can be selectively located in one or other of the two passages as required.

The mounting bracket 54 supports a connecting arrangement 56 for connecting the elements 51 together. The connecting arrangement 56 comprises a male member 57 and a female socket 58 on each element. The male member and female socket both lie on the axis 59 of the elements, and adjacent elements are connected together by clipping the distal end 60 of the male member into the female socket of the adjacent member. In this manner a chain of end-to-end elements can be formed which together define a containment device 62 as shown in Figure 13. In a usual application there will be approximately 30 such elements per meter of containment device. The length of the containment device can thus be varied to suit any particular application.

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It is preferred that there is an articulated connection between adjacent elements. This can be achieved by, for example, making the male member pivotable relative to the mounting bracket, or having the end 60 of the male member pivotable relative to the female socket 58 of the adjacent element. In the present arrangement the proximate end of the male member 57 is coupled to the bracket 54 by a ball and socket type connection 61 which provides the necessary articulation facility and enables adjacent elements to be moved out of axial alignment with each other, as depicted in Figure 13. The passages 55 in the interconnected elements 55 will, of course, be aligned, and be adapted to contain cables as indicated by dotted lines 63 in Figure 12.

The box 65 depicted in Figure 14 has an outlet opening 66 formed in a removable plate 67. The plate 67 has a connection arm 68 mounted thereto having a keyway 69 therein. The male member 57 is shaped to fit into the keyway 69 and engage therewith in order to secure the connection thereto of a containment device 62. Thus, cables from computer equipment will be passed out of the opening 66 and then engaged in a containment device 62 in the manner previously described. The containment device will then be connected to the arm 68 by clipping the male member 57 of the last element into the keyway 69.

The plate 67 is removable from the rest of the box. Once removed a large rectangular opening 70 is defined in the back wall 71 of the box. The plate 67 has a transverse slot 72 extending between the edge of the plate and the outlet opening 66. The cables will be passed along this slot 72 to locate them in this outlet opening prior to fitting the containment device 62 thereto. This arrangement will simplify the fitting of the cables into the outlet opening.

Any suitable arrangement may be made for connecting the opposite end of the containment device to the wall or other connection point where mains sockets and other connection sockets are located. Those sockets may be shielded by a suitable box or panel (not shown) which may have a male member similar to that of the

- 11 -

elements 51 for connection to the containment device 62.

It is to be understood that various alternations, modifications and/or additions may be introduced into the constructions and arrangements of parts previously described without departing from the spirit or ambit of the invention as defined in the appended claims.

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CLAIMS

1. An electrical cable containment device comprising an elongate flexible member having at least one cable containment passage therein extending the length of the device and an entrance opening into said passage which runs the length of the passage for inserting electrical cable laterally into the passage.
2. An electrical cable containment device according to claim 1 wherein there are a plurality of containment passages in said device, each said passage having an entrance opening thereto.
3. An electrical cable containment device according to claim 2 wherein a plurality of containment passages have a single entrance opening thereto.
4. An electrical cable containment device according to any preceding claim wherein the or each said entrance opening has a return lip for preventing the inadvertent removal of cables from said passage or passages.
5. An electrical cable containment device according to any preceding claim wherein the device is made of a resiliently flexible plastics material.
6. An electrical cable containment device according to any preceding claim comprising a plurality of interconnected elements which form said elongate flexible member.
7. An electrical cable containment device according to claim 6 wherein the elements each have a central passage extending the length thereof and a flexible rope or tie extends down the central passages of the interconnected elements to hold the elements in assembly.

8. An electrical cable containment device according to claim 6 wherein the elements each have connection formations thereon for interconnecting adjacent elements together end-to-end in a chain-like manner.
9. An electrical cable containment device according to claim 8 wherein the connection formations are configured to permit articulated movement between adjacent elements.
10. An electrical cable containment device according to claim 9 wherein said formations comprise a male member on one end of each element and a female socket in the other end of each element, the distal end of the male member releasably engaging in the female socket of adjacent interconnected in the female socket of adjacent interconnected elements.
11. An electrical cable containment device according to claim 10 wherein the male member is mounted to the element by means of a ball and socket connection which provides for said articulated movement.
12. An electrical cable containment box for fitting to a rear side of an item of desk top electrical equipment comprising, a housing having a back panel, a top panel, and a base, and a generally open front side which in use will be placed against said rear side, an outlet opening in said housing through which electrical cables from said electrical equipment can pass, and connection means for connecting said housing to said electrical equipment.
13. An electrical cable containment box according to claim 12 wherein said connection means comprises a foot or feet for location beneath a said item of electrical equipment will rest to hold the containment box against said electrical equipment.
14. An electrical cable containment box according to claim 13 wherein said

foot or feet is an extension of and co-planar with said base.

15. An electrical cable containment box according to any one of claims 12 to 14 wherein said housing has air vents therein for venting the item of electrical equipment.

16. An electrical cable containment box according to any one of claims 12 to 15 wherein the housing is adjustable in width and/or height.

17. An electrical cable containment box according to any one of claims 12 to 16 wherein said outlet opening is formed in a plate which is removable from the housing and a slot is formed through the plate which extends between an edge of the plate and said opening.

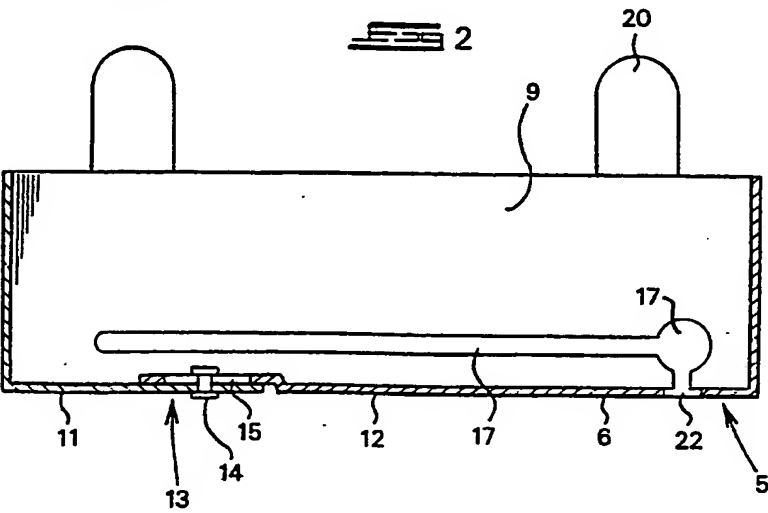
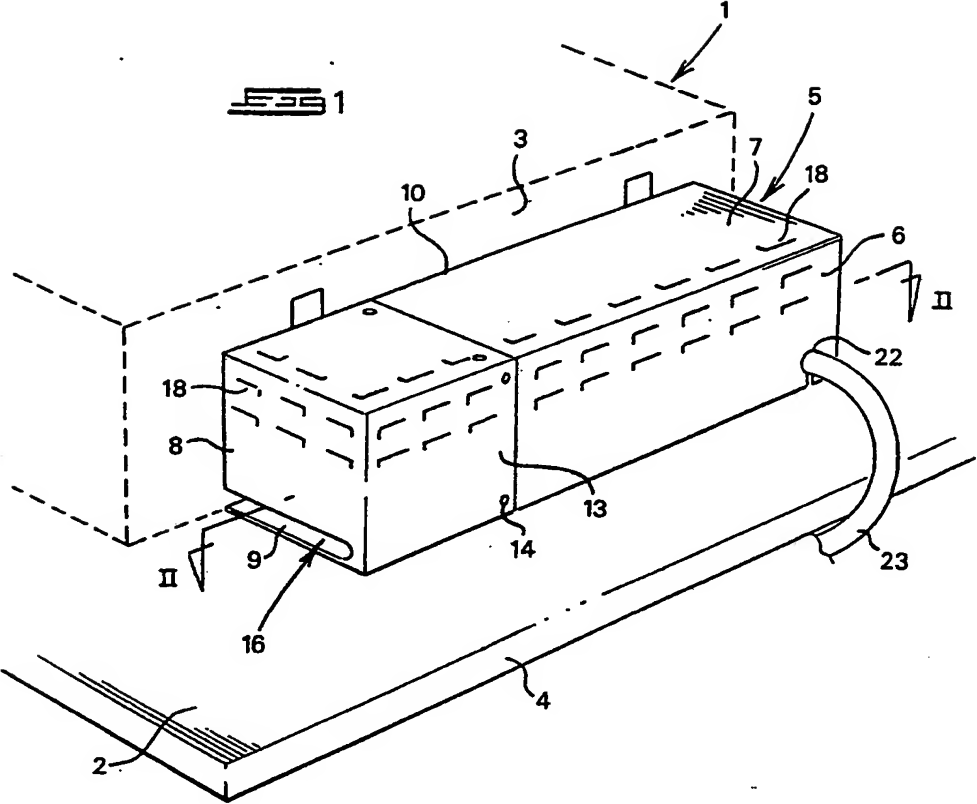
18. An electrical cable containment box according to any one of claims 12 to 17 which includes attachment means for attaching an electrical cable containment device according to claim 1 thereto.

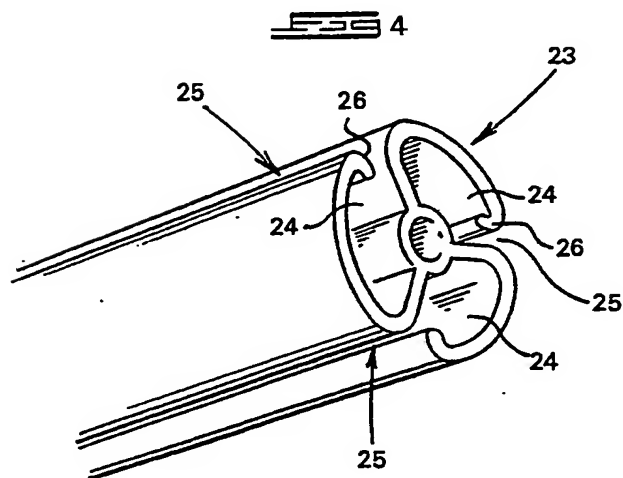
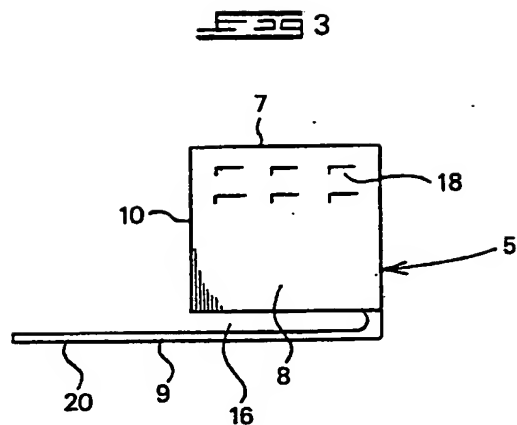
19. An electrical cable containment box according to any one of claims 12 to 18 in assembly with an electrical cable containment device according to any one of claims 1 to 11.

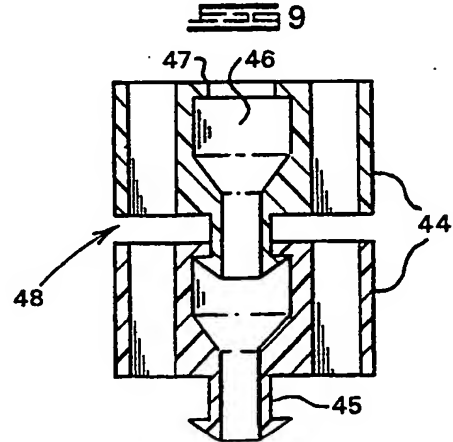
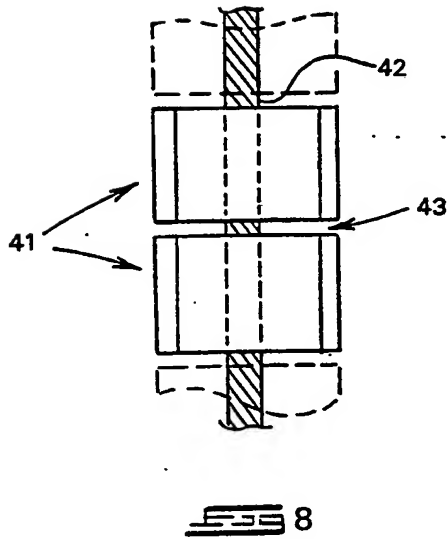
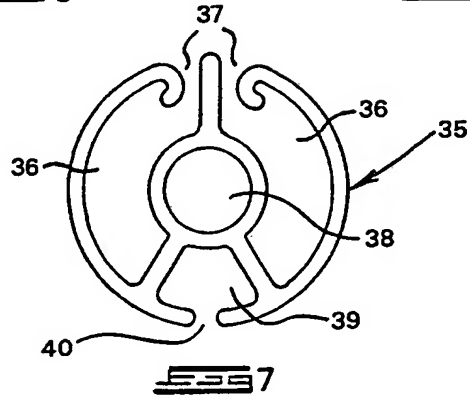
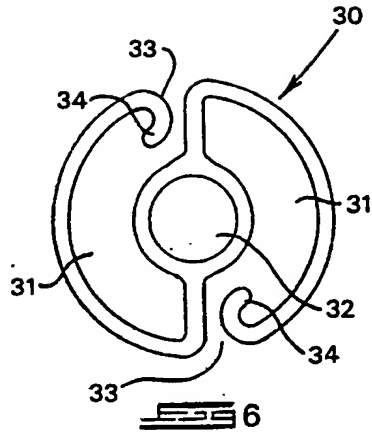
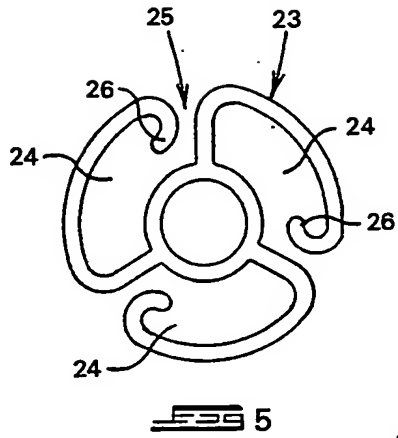
20. An element for an electrical cable containment device according to any one of claims 6 to 11.

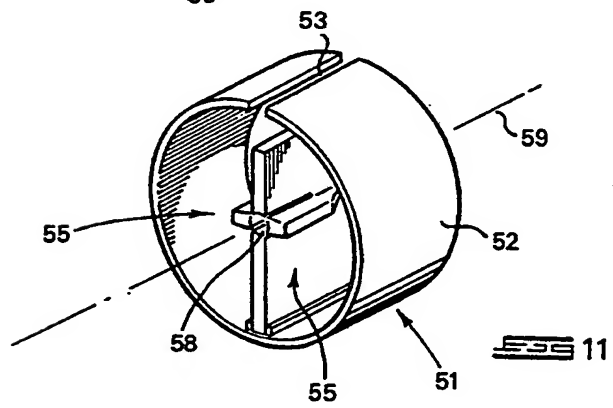
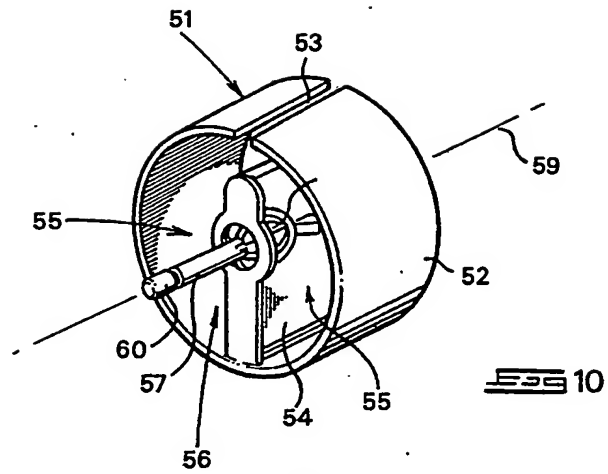
21. An electrical cable containment device substantially as hereinbefore described with reference to any one of the embodiments depicted in the drawings.

22. An electrical cable containment box substantially as hereinbefore described with reference to Figures 1 to 3 or Figure 14 of the drawings.

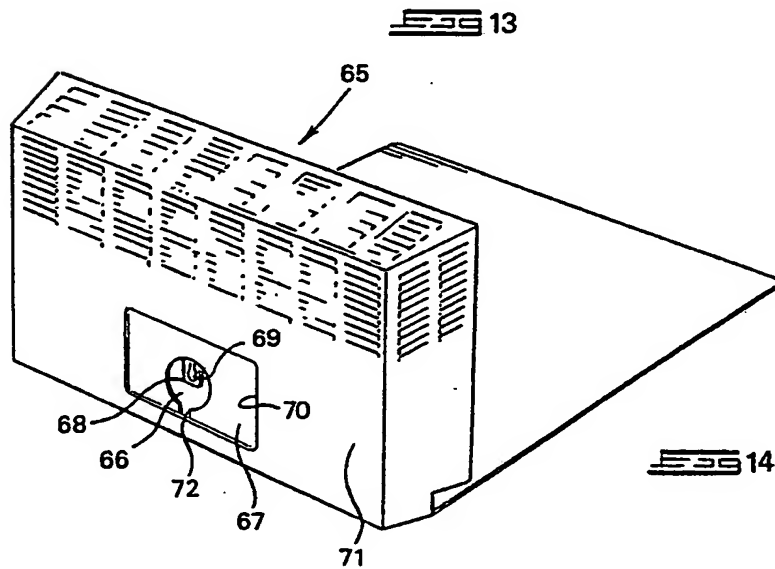
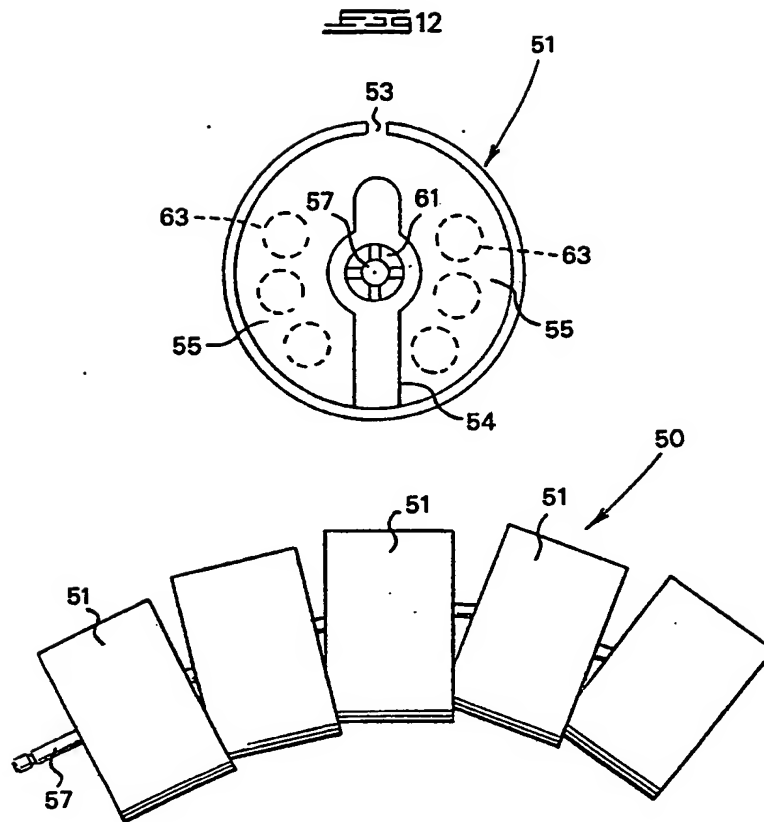




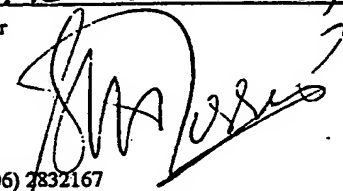




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A. CLASSIFICATION OF SUBJECT MATTER Int. Cl. ⁵ H02G 3/04, B65H 75/02 According to International Patent Classification (IPC) or to both national classification and IPC																						
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC : H02G 3/04, H01R 13/72, B65H 75/02 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU : IPC as above Electronic data base consulted during the international search (name of data base, and where practicable, search terms used) DERWENT : B65H 75/- and cable: and (cont: or stor:)																						
C. DOCUMENTS CONSIDERED TO BE RELEVANT																						
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.																				
X	US,A, 4988838 (KIRTLAND) 29 January 1991 (29.01.91) Col 3 lines 21-37, Col 4 lines 4-49, Figs 3 and 7	1,2,4-6,8,9																				
X	EP,A, 278923 (CANALPLAST S.r.l.) 17 August 1988 (17.08.88) Col 3 lines 10-42, Figs 1 and 15	1-3,5,6,8																				
X	US,A, 4937400 (WILLIAMS) 26 June 1990 (26.06.90) Col 5 lines 9-66, Fig 1	1,4,5																				
X	US,A, 5024251 (CHAPMAN) 18 June 1991 (18.06.91) Col 2 lines 55-68, Fig 1	1,6,8																				
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.																						
* Special categories of cited documents : <table border="0"> <tr> <td>"A"</td> <td>document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T"</td> <td>later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle of theory underlying the invention</td> </tr> <tr> <td>"E"</td> <td>earlier document but published on or after the international filing date</td> <td>"X"</td> <td>document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L"</td> <td>document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y"</td> <td>document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"O"</td> <td>document referring to an oral disclosure, use, exhibition or other means</td> <td>"&"</td> <td>document member of the same patent family</td> </tr> <tr> <td>"P"</td> <td>document published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			"A"	document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle of theory underlying the invention	"E"	earlier document but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family	"P"	document published prior to the international filing date but later than the priority date claimed		
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"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art																			
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"P"	document published prior to the international filing date but later than the priority date claimed																					
Date of the actual completion of the international search 23 November 1992 (23.11.92)		Date of mailing of the international search report 2 Dec 1992 (02.12.92)																				
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. 06 2853929		Authorized officer  E.N. PERRIS Telephone No. (06) 2832167																				

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU92/00467

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
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Y	AU,A, 56069/90 (W.L. GORE AND ASSOCIATES, INC) 13 December 1990 (13.12.90) Claim 1, Fig 1	1-9
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